

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-180743

(43)Date of publication of application : 18.07.1995

(51)Int.Cl.

F16F 13/08

(21)Application number : 06-250389

(71)Applicant : TOKAI RUBBER IND LTD

(22)Date of filing : 17.10.1994

(72)Inventor : TANAHASHI HIROAKI

(30)Priority

Priority number : 05282592

Priority date : 11.11.1993

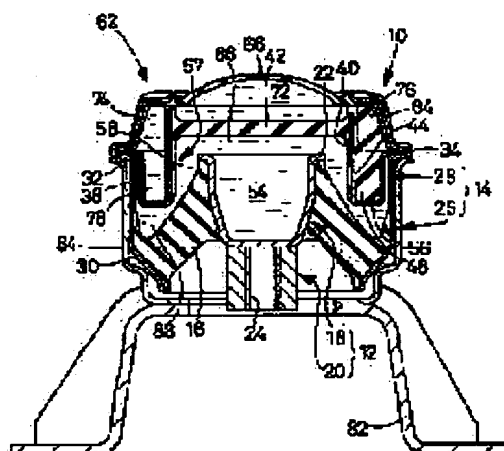
Priority country : JP

## (54) FLUID SEALING TYPE MOUNT

(57)Abstract:

**PURPOSE:** To enable a vibration proofing effect against input vibration in the axial direction to be effectively exhibited, and concurrently form a bottle neck passage which can prevent the occurrence of a high dynamic spring motion when vibration is inputted in the direction orthogonal to the axis in the main liquid chamber of the fluid sealing type mount.

**CONSTITUTION:** A step section 56 is provided at the outer circumferential wall section of a main liquid chamber 54, an inner projection 57 in a ring shape which is projected toward the direction orthogonal to the axis from the side of an outer member 14, is formed at the bottom section side of the main liquid chamber 54, and concurrently an inner member 12 is inserted in the inner projection 57 so as to be positioned therein, so that a bottle neck passage 58 in a ring shape is thereby formed between the surface of the inner member 12 and the surface of the inner projection 57, which are opposite to each other in the direction orthogonal to the axis.



## LEGAL STATUS

[Date of request for examination] 17.09.1998

[Date of sending the examiner's decision of rejection] 06.06.2000

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**CLAIMS**

---

[Claim(s)]

[Claim 1] While allotting an inner member to opening of a cylinder-like-object-with-base-like outer member, by connecting these outer member and an inner member with a rubber elasticity object In fluid filled system mounting to which it makes it come to form the main liquid room where a part of wall consisted of said rubber elasticity objects, and incompressible fluid was enclosed with the interior between these outer member and an inner member While forming a way projected part among annular [ which prepares the level difference section in the peripheral-wall section of said main liquid room, and projects toward a method of the inside of the direction of an axial right angle from said outer member side in a pars-basilaris-ossis-occipitalis side of this main liquid room ] Fluid filled system mounting which carries out the insertion point of said inner member into this inner direction projected part, and is characterized by forming annular constriction passage between the direction opposed faces of an axial right angle of this inner member and this inner direction projected part.

[Claim 2] Fluid filled system mounting according to claim 1 to which said level difference section is formed in a shaft-orientations interstitial segment of said main liquid room by being located.

[Claim 3] Fluid filled system mounting according to claim 1 or 2 to which a method projected part of said inside is projected and formed even in a method of the inside of the direction of an axial right angle rather than a periphery edge of said rubber elasticity object.

[Claim 4] Insert the bottom wall section of said outer member, and said main liquid room is matched for said main liquid room with an annular orifice member while forming a subliquid room where a part of wall was constituted from a flexible film by the opposite side, and incompressible fluid was enclosed with it inside. Fluid filled system mounting given in claim 1 thru/or any of 3 while forming an orifice path which opens said main liquid room and said subliquid room for free passage mutually, they are. [ which formed a method projected part of said inside by this orifice member ]

[Claim 5] Fluid filled system mounting given in claim 1 thru/or any of 3 they are. [ which formed a method projected part of said inside by covering shaft-orientations predetermined length by the side of a pars basilaris ossis occipitalis, and making the barrel wall section of said outer member project to a method of the inside of the direction of an axial right angle ]

[Claim 6] Fluid filled system mounting given in claim 1 thru/or any of 5 they are. [ which constituted the bottom wall section of said outer member by moving-part material which can be displaced ]

[Claim 7] Fluid filled system mounting given in claim 1 thru/or any of 6 they are. [ this rubber elasticity object carries out / any / a compression set in a load input has the shape of an abbreviation taper cartridge to which said rubber elasticity object inclines and extends in a pars-basilaris-ossis-occipitalis side of this outer member toward said inner member from opening of said outer member, and this inner member is made to displace from opening of this outer member by method of the outside of shaft orientations ]

---

[Translation done.]

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to fluid filled system mounting which is used suitable for the engine mount of an automobile etc. and which acquired the vibrationproofing effect based on the fluid operation of the fluid enclosed with the interior.

[0002]

[Background of the Invention] As it is infixed from the former between the members which constitute an oscillating transfer system and is indicated by JP,61-62633,A, JP,62-23178,B, etc. as a kind of the mounting equipment which carries out vibrationproofing connection of both [ these ] the members While allotting an inner member to opening of a cylinder-like-object-with-base-like outer member, by connecting these outer member and an inner member with a rubber elasticity object As opposed to vibration of the shaft orientations which form the main liquid room where a part of wall consisted of said rubber elasticity objects, and incompressible fluid was enclosed with the interior between these outer member and the inner member, and are inputted mainly between an inner member and an outer member Fluid filled system mounting by which the vibrationproofing effect based on a fluid operation of a resonance operation of an enclosure fluid, flow resistance, etc. was demonstrated is known.

[0003] Moreover, it sets to writing \*\*\*\* fluid filled system mounting. For example, as it is filled and is shown also in said official report for the purpose of vibrationproofing of high frequency oscillation, such as a sound The umbrella part material which spreads in the direction of an axial right angle in the main liquid interior of a room is made to fix to an inner member, annular constriction passage is formed between the peripheral face of this umbrella part material, and the main liquid indoor peripheral surface, and the structure which acquired the low dynamic spring effect based on the fluid operation of the fluid which flows the inside of this constriction passage is adopted suitably.

[0004] However, such umbrella part material is faced preparing in an inner member. Since it is generally necessary to form umbrella part material by another member, and to fix to an inner member from reasons manufacture up [ by the metal mold structure of the rubber elasticity object by which vulcanization adhesion is carried out at an inner member ] Manufacture was troublesome, in addition to a cost rise not being avoided, there was a possibility that umbrella part material might separate from an inner member at the time of use, and there was fault of being inferior to endurance etc.

[0005] And since it is not avoided that the capacity of the constriction passage which needs to make the inside dimension method of the main liquid room large enough in the direction of an axial right angle, and is formed in the surroundings of umbrella part material of it increases in order to arrange umbrella part material When an inner member is made to displace to an outer member at the time of the oscillating input of the direction of an axial right angle by the direction of an axial right angle, Since the fluid flow rate made to flow by the hoop direction increased and a remarkable raise in a dynamic spring in a specific frequency region tends to be made to produce the inside of constriction passage by fluid operation of this fluid, also when it became a big problem, it was on the damping characteristic.

[0006] Moreover, said rubber elasticity object goes to an inner member from opening of an outer member especially. By the load input you are made to displace by the direction in which it has the shape of an abbreviation taper cartridge inclined and prolonged in the pars-basilaris-ossis-occipitalis side (the main liquid interior-of-a-room side) of this outer member, and an inner member projects in the method of the outside of shaft orientations from opening of an outer member In fluid filled system mounting of the pendant support type in which this rubber elasticity object carries out a compression set Generally an inner member adds to you projecting to the main liquid interior of a room, it being made to be located, and the inside dimension method of the main liquid room being more greatly set as it. Since it is necessary to set up the capacity of the main liquid room greatly enough also in order for umbrella part material to tend to interfere in a rubber elasticity object etc. from the reasons of structure at the time of deformation of the rubber elasticity object by the load input and to avoid this interference High dynamic spring-ization at the time of the oscillating input of the direction of an axial right angle which originates the inside of constriction passage in a fluid operation of the fluid made to flow by the hoop direction tended to become a much more big problem.

[0007]

[Problem(s) to be Solved] it succeed in this invention against the background of the situation like \*\*\*\*, and in here, the place make into the solution technical problem have it in offer fluid filled system mounting with easy manufacture with easy and structure which can acquire advantageously the vibrationproofing effect of high frequency oscillation be input into shaft orientations based on a fluid operation of an enclosure fluid, avoid high dynamic spring-ization at the time of the oscillating input of the direction of an axial right angle.

[0008]

[Means for Solution] In order to solve this technical problem, and a place by which it is characterized [ of this invention ] While allotting an inner member to opening of a cylinder-like-object-with-base-like outer member, by connecting these outer member and an inner member with a rubber elasticity object In fluid filled system mounting to which it makes it come to form the main liquid room where a part of wall consisted of said rubber elasticity objects, and incompressible fluid was enclosed with the interior between these outer member and an inner member While forming a way projected part among annular [ which prepares the level difference section in the peripheral-wall section of said main liquid room, and projects toward a method of the inside of the direction of an axial right angle from said outer member side in a pars-basilaris-ossis-occipitalis side of this main liquid room ] The insertion point of said inner member is carried out into this inner direction projected part, and it is in having formed annular constriction passage between the direction opposed faces of an axial right angle of this inner member and this inner direction projected part.

[0009] Moreover, said level difference section is located and formed in a shaft-orientations interstitial segment of said main liquid room in the first desirable mode of this invention.

[0010] Furthermore, in the second desirable mode of this invention, a method projected part of said inside is projected and formed even in a method of the inside of the direction of an axial right angle rather than a periphery edge of said rubber elasticity object again.

[0011] Furthermore, it sets in the third desirable mode of this invention. While a subliquid room where the bottom wall section of said outer member was inserted, a part of wall was constituted from a flexible film by the opposite side with said main liquid room, and incompressible fluid was enclosed with the interior is formed An annular orifice member is allotted to said main liquid room, and while an orifice path which opens said main liquid room and said subliquid room for free passage mutually is formed, a method projected part of said inside is formed in this orifice member.

[0012] Furthermore, a method projected part of said inside is formed by covering shaft-orientations predetermined length by the side of a pars basilaris ossis occipitalis, and making the barrel wall section of said outer member project to a method of the inside of the direction of an axial right angle in the fourth desirable mode of this invention again.

[0013] Furthermore, it is constituted in the fifth desirable mode of this invention by moving-part material which can displace the bottom wall section of said outer member. In addition, as for

writing [ only tabular rubber in which elastic deformation is possible and predetermined distance are constituted by movable plate supported possible / displacement /, and this moving-part material acquires them, and ] \*\*\*\* moving-part material, it is possible to also make the bottom wall section of an outer member constitute substantially by arranging in a hole as opposed to said annular orifice member fixed for example, to an outer member.

[0014] By moreover, the load input an inner member is made to displace from opening of an outer member as this invention is indicated by said JP,61-62633,A, JP,62-23178,B, etc. by method of the inside of shaft orientations Although it is applicable, of course also to mounting of a \*\*\*\* support type in which a rubber elasticity object carries out a compression set In the sixth desirable mode of this invention, said rubber elasticity object goes to said inner member from opening of said outer member. By the load input you are made to displace by direction in which it has the shape of an abbreviation taper cartridge inclined and prolonged in a pars-basilaris-ossis-occipitalis side of this outer member, and this inner member projects in a method of the outside of shaft orientations from opening of this outer member This rubber elasticity object is advantageously applied to mounting of a pendant support type which carries out a compression set.

[0015]

[Function and Effect] In fluid filled system mounting made into the structure of following such this invention When vibration of shaft orientations is inputted between an inner member and an outer member, and a way point is made to displace to the bottom wall section of an outer member among inner members by the approach / isolation direction In connection with the main liquid room capacity between the shaft-orientations opposed faces of these inner member and an outer member carrying out increase and decrease of change, it sets to this main liquid interior of a room. Between the portions located in a rubber elasticity object side rather than the level difference section between the shaft-orientations opposed faces of an inner member and an outer member Repetition fluid of the fluid which leads is made to produce constriction passage, and based on a resonance operation of this fluid etc., it is filled, and the vibrationproofing effect over input vibration of high-frequency regions, such as a sound, may be demonstrated.

[0016] Namely, it sets to this fluid filled system mounting. By having formed the method projected part of inside in the pars-basilaris-ossis-occipitalis side of the main liquid room, and carrying out an opposite location in the direction of an axial right angle to an inner member Annular constriction passage might be made to form effectively between the method projected part of these inside, and an inner member. By it Securing the vibrationproofing effect demonstrated by the umbrella part material adopted from the former, and the same effect, assembly etc. succeeds in troublesome umbrella part material with needlessness, and might make fast improvement attain about manufacture nature, cost nature, endurance, etc.

[0017] And it sets to this fluid filled system mounting. Since it is not necessary to allot the umbrella part material which projects in the direction of an axial right angle from an inner member, it is not necessary to enlarge the inside dimension method of the main liquid room specially. By moreover, the method projected part of inside The direction size of an axial right angle of the main liquid room from being reduced in a constriction passage formation part The fluid flow rate made to flow the inside of constriction passage at the time of the oscillating input of the direction of an axial right angle by the hoop direction is stopped advantageously, and high dynamic spring-ization resulting from a fluid operation of this fluid may be mitigated or prevented effectively.

[0018] Moreover, it sets in said the first desirable mode and second desirable mode of this invention. All at the time of the oscillating input of shaft orientations Between the shaft-orientations opposed faces of an inner member and an outer member, The relative capacity change between the portions located in a rubber elasticity object side may be made to arise much more advantageous, the fluid style mechanical moment which leads constriction passage by it may fully be secured from the level difference section, and the vibrationproofing effect based on a fluid operation of this fluid may be demonstrated much more effectively.

[0019] Furthermore, it sets in said third desirable mode of this invention again. While being able to acquire the vibrationproofing effect over input vibration of a different frequency region from

the frequency region where a fluid operation of the fluid made to flow through constriction passage is demonstrated based on a fluid operation of the fluid made to flow through an orifice path. Since an orifice path is formed in the interior of an inner direction projected part, effects, such as a deployment of a space and reduction of components mark, may be attained advantageously.

[0020] Furthermore, since the method projected part of inside is formed in said fourth desirable mode of this invention again when crookedness etc. carries out the outer member itself, effects, such as reduction of components mark and improvement in manufacture nature, may be attained advantageously.

[0021] Furthermore, in said fifth desirable mode of this invention, from the internal pressure rise of the main liquid room at the time of the oscillating input of a further different frequency region from the frequency region where a fluid operation of the fluid make to flow through constriction passage be demonstrate be mitigate or cancel based on the displacement of moving-part material, it cross to a larger frequency region and the good vibrationproofing effect may be demonstrate.

[0022] Moreover, it sets in said sixth desirable mode of this invention. By the ability having succeeded in umbrella part material with needlessness, securing the vibrationproofing effect demonstrated by the conventional umbrella part material and the same effect in the so-called pendant support type of fluid filled system mounting. The interference to the rubber elasticity object of umbrella part material which had become a problem from the former in this pendant support type of fluid filled system mounting etc. may be canceled, and miniaturization of capacity reduction of the main liquid room and constriction passage, as a result the whole mounting may be attained very effectively.

[0023]

[Example] Hereafter, in order to clarify this invention still more concretely, the example of this invention is explained to details, referring to a drawing.

[0024] First, the engine mount 10 for automobiles as one example of this invention is shown in drawing 1. The inner member 12 allotted by separating predetermined distance mutually and the outer member 14 are made into the structure which it comes to connect with the rubber elasticity object 16, and this engine mount 10 carries out the elastic suspension of the power unit in the state of lowering to the body by attaching the inner member 12 in a power-unit side, and attaching the outer member 14 in a body side, respectively. In addition, a main vibration which should be carried out vibrationproofing to this engine mount 10 will be inputted in the vertical direction in drawing 1 under such a wearing condition.

[0025] The inner member 12 is constituted more by details with the inner metallic ornaments 18 of an abbreviation cup configuration, and the attachment block 20. While the taper which expands the diameter of the inner metallic ornaments 18 slightly toward an opening side in the circumferential wall is attached, in the opening periphery section, crookedness formation of the flange-like section 22 which projects in the method of the outside of the direction of an axial right angle is carried out. Moreover, the attachment block 20 has fixed in the bottom wall section rear face of these inner metallic ornaments 18. And the tapped hole 24 is installed by shaft orientations, shaft-orientations one opening edge of this tapped hole 24 is covered by the bottom wall section of the inner metallic ornaments 18, and the opening edge of shaft-orientations another side carries out a opening to this attachment block 20 toward the method of the outside of shaft orientations.

[0026] on the other hand, the outer member 14 is attached in shaft-orientations one (upper part) opening of the outer metallic tube implement 26 which has the shape of a cylindrical shape of a major diameter, and this outer metallic tube implement 26 — having — this opening — a fluid — it is constituted by the outer bottom wall member 28 covered densely. The outer metallic tube implement 26 has the level difference section 32 which spreads in the method of the outside of the direction of a path, and the caulking section 34 which begins to be prolonged from the periphery edge of this level difference section 32 in the edge of shaft-orientations another side (upper part) while it has the taper cylinder part 30 minor-diameter-ized gradually as it goes for the method of the outside of shaft orientations to shaft-orientations one (lower part) side. And

predetermined distance is separated to the method of the outside of the direction of a path of the inner member 12, and it is allotted on the abbreviation same axial center, and the inner member 12 is in the condition that the lower limit section of that attachment block 20 projects slightly, and hold arrangement is carried out inside the outer metallic tube implement 26 as this outer metallic tube implement 26 is shown in drawing 2 .

[0027] And the rubber elasticity object 16 is infixed between the peripheral face of the inner metallic ornaments 18 which constitute the inner member 12, and the inner skin of the taper cylinder part 30 of the outer metallic tube implement 26 which constitutes the outer member 14, and it really by which vulcanization adhesion of the rubber elasticity object 16 was carried out to these inner metallic ornaments 18 and the outer metallic tube implement 26 considers as the vulcanization mold goods 36. This rubber elasticity object 16 has the shape of a heavy-gage abbreviation taper cartridge which inclines toward a way among the outer metallic tube implements 26, and is prolonged toward the inner metallic ornaments 18 from the taper cylinder part 30 of the outer metallic tube implement 26. Moreover, as for the portion by which vulcanization adhesion was carried out, deformation is suppressed by the opening side peripheral face of the inner metallic ornaments 18 by the flange-like section 22 of the inner metallic ornaments 18 among this rubber elasticity object 16.

[0028] Moreover, the outer bottom wall member 28 which collaborates with the inner metallic ornaments 18 and constitutes the inner member 12 really containing the movable rubber board 42 as moving-part material allotted in drawing 3 — the inner hole 40 of the orifice metallic ornaments 38 which have the shape of an approximate circle annulus as a whole, and these orifice metallic ornaments 38 consists of vulcanization mold goods as shown also in 5.

[0029] the orifice metallic ornaments 38 having the shape of an approximate circle annulus of the channel section which carries out a opening to shaft-orientations one (upper part) side in there, and filling up with restoration rubber 46 in the slot 44 — as a whole — a solid — it considers as the shape of a heavy-gage cylindrical shape. moreover, in the outside barrel wall section 48 of these orifice metallic ornaments 38 While the outside flange-like supporter 50 is formed in the opening periphery section, the inside barrel wall section 52 rather than the outside barrel wall section 48, a shaft-orientations size is lengthened, and is projected and made into the shaft-orientations upper part, and vulcanization adhesion of the periphery edge of the disk type-like movable rubber board 42 is carried out to the protrusion point of this inside barrel wall section 52 — the inner hole 40 — a fluid — it is blockaded densely. In addition, the movable rubber board 42 to apply is formed in one with restoration rubber 46.

[0030] And it is allotted to top opening of the outer metallic tube implement 26, and the supporter 50 of the orifice metallic ornaments 38 puts on the level difference section 32 of the outer metallic tube implement 26, and caulking immobilization is carried out by the caulking section 34 as this outer bottom wall member 28 is shown in drawing 1 . it — top opening of the outer metallic tube implement 26 — the outer bottom wall member 28 — a fluid — it is covered densely, with a part of wall consists of rubber elasticity objects 16 in the interior of the outer metallic tube implement 26, and the main liquid room 54 where predetermined incompressible fluid was enclosed is formed. In addition, as an enclosure fluid, by this example, the low viscous fluid of 100 or less cSts is adopted suitably, for example, water, alkylene glycol, a polyalkylene glycol, silicon oil, etc. may be used so that the vibrationproofing effect based on a resonance operation of the fluid to shaft-orientations input vibration may be demonstrated effectively.

[0031] Moreover, if it is in the main liquid room 54 formed by doing in this way The portion which the slot 44 of the orifice metallic ornaments 38 was filled up with restoration rubber 46 among the outer bottom wall members 28, and was made into the thick-cylinder configuration is made to be entered and located by even the amount of [ of the outer metallic tube implement 26 ] shaft-orientations abbreviation center section. By it While the level difference side 56 is formed in the shaft-orientations interstitial segment of the main liquid room 54 The way projected part 57 is formed among annular [ which projects / rather than this level difference side 56 / toward the method of the inside of the direction of a path from the outer metallic tube implement 26 side in a pars-basilaris-ossis-occipitalis side (the inside of drawing 1 , on) ], among these the diameter of the main liquid room 54 is reduced by the direction projected part 57 in the direction



of a path. Moreover, the point of the inner member 12 is made to be entered and located by even the interior of this inner direction projected part 57, and the annular constriction passage 58 is formed in it of it between the direction opposed faces of a path of the inner direction projected part 57 and the inner member 12. In addition, at the time of mounting wearing, although the inner member 12 is made only for the specified quantity to be displaced to the outer member 14 by inputting the support load of a power unit by the shaft-orientations lower part, the amount of [ of the inner member 12 ] shaft-orientations point enters in the inner direction projected part 57, it is made it to be located also under such a wearing condition, and the constriction passage 58 is formed.

[0032] Furthermore, the covering device material 62 is put [ it piles it up and ] together and arranged in the outside of the outer bottom wall member 28. shaft-orientations one opening of the lid metallic ornaments 64 which have the shape of an abbreviation taper cartridge as this covering device material 62 is shown also in drawing 6 , and these lid metallic ornaments 64 -- a fluid -- the deformation which consists of light-gage rubber membrane blockaded densely -- it is constituted by the easy diaphragm 66. In here, while the lid metallic ornaments 64 have the supporter 68 of the shape of a flange which spreads in the method of the outside of the direction of a path in shaft-orientations one opening periphery section, it has the circular ring tabular presser-foot section 70 which spreads in the method of the inside of the direction of a path in the opening periphery section of shaft-orientations another side, and vulcanization adhesion of the periphery section of diaphragm 66 is carried out to a part for opening of this presser-foot section 70.

[0033] And the supporter 68 of the lid metallic ornaments 64 is attached in the outer member 14 by making it go away outer metallic tube implement 26, and carrying out caulking immobilization with the supporter 50 of the orifice metallic ornaments 38 in the section 34 by putting such covering device material 62 on the shaft-orientations outside of the outer bottom wall member 28. By this, it is sealed to outer space between the movable rubber board 42 of the outer bottom wall member 28, and diaphragm 66, and predetermined incompressible fluid is enclosed with the interior, and while the subliquid room 72 where capacity change is permitted based on deformation of diaphragm 66 is formed, the orifice path 74 which extends in a hoop direction is formed between the orifice metallic ornaments 38 and the lid metallic ornaments 64. Moreover, while this orifice path 74 is intercepted with cutoff rubber 76 in one on a periphery The free passage hole 78 which opens this orifice path 74 for free passage at the main liquid room 54 to the hoop direction both ends of the orifice path 74 which sandwiched the cutoff section by this cutoff rubber 76, The fluid flow to which the free passage way 80 which opens this orifice path 74 for free passage in the subliquid room 72 is formed, respectively, with leads the orifice path 74 between the main liquid room 54 and the subliquid room 72 through these free passage hole 78 and the free passage way 80 is permitted. In addition, in this example, it is based on the fluid style actuation which leads the orifice path 74, and length, the cross section, etc. of the orifice path 74 are set up so that a damping effect may be demonstrated at the time of the input of subsonic vibration, such as a shake.

[0034] The engine mount 10 made into writing \*\*\*\* structure For example, the bracket 84 of the shape of a cylindrical shape equipped with the attachment leg 82 is received as shown in drawing 1 . While press fit immobilization is carried out, the outer metallic tube implement 26 is attached and the outer member 14 fixes to a body side through this bracket 84, with the bolt screwed on the attachment block 20 of the inner member 12 When the inner member 12 fixes to a power-unit side, it will be infixed between these power units and the body, a power unit will be hung to a body side, and the elastic suspension will be carried out in the condition.

[0035] And if vibration which should be carried out vibrationproofing is inputted between the inner member 12 and the outer member 14 under such a wearing condition, the inner member 12 and the outer member 14 will carry out a relative displacement mainly to shaft orientations, consequently fluid flow will be made to be generated in the main liquid room 54 and the subliquid room 72, and the predetermined vibrationproofing effect will be demonstrated based on a fluid operation of this fluid.

[0036] In details, more at the time of the input of the subsonic vibration around 10Hz, such as a

shake and a bounce By making the fluid flow which leads produce the orifice path 74 based on the relative internal pressure difference between the main liquid room 54 and the subliquid room 72 A high damping effect may be demonstrated based on a fluid operation of this fluid, and although the flow resistance of the orifice path 74 will become remarkably large at the time of the input of the inside cycle vibration of about 50–100Hz of \*\*\*\* etc. and \*\*\*\*\* will also be lock-out-ized substantially By absorbing the internal pressure fluctuation caused in the main liquid room 54 based on the relative displacement of the shaft orientations of the inner member 12 and the outer member 14 based on the elastic deformation of the movable rubber board 42 which constitutes the bottom wall section of the main liquid room 54 The remarkable rise of a mounting dynamic spring constant resulting from the internal pressure rise of the main liquid room 54 may be avoided, and the good vibrationproofing engine performance may be demonstrated.

[0037] Furthermore, although a fluid pressure absorption effect with the movable rubber board 42 also becomes is fully also hard to be demonstrated at the time of the input of the high frequency oscillation of 100Hz or more of \*\*\*\*, such as \*\*\*\*, also as for high-speed \*\* When the inner member 12 is made to displace to the outer member 14 by shaft orientations and carries out approach / isolation displacement to the movable rubber board 42 with which this inner member 12 constitutes the bottom wall section of the outer member 14 In the main liquid room 54 between the field 86 between shaft-orientations opposed faces of these inner member 12 and the movable rubber board 42, and the annular major-diameter field 88 in which it is caudad located from the level difference side 56 and whose diameter is not reduced The fluid flow which leads is made to produce the constriction passage 58, with the low dynamic spring effect is demonstrated based on a fluid operation of this fluid. In addition, in this example, based on the resonance operation of the fluid which flows through the constriction passage 58, the cross section, length, etc. of this constriction passage 58 are set up so that the effective low dynamic spring effect at the time of the input of 100–200Hz high frequency oscillation may be demonstrated.

[0038] By the constriction passage's 58 forming the level difference side 56 in the shaft-orientations interstitial segment of the peripheral-wall section of the main liquid room 54, and reducing only the diameter of a pars-basilaris-ossis-occipitalis side rather than this level difference side 56 in here From being formed between the direction opposed faces of a path of the outer member 14 and the inner member 12 Without using the umbrella part material which projects in the direction of a path from the inner member 12 like before The fluid style mechanical moment at the time of an oscillating input can fully be secured, the effective vibrationproofing effect can be acquired, so, by the ability having succeeded in umbrella part material etc. with needlessness, structure is simplified and manufacture nature and cost nature may improve advantageously.

[0039] moreover, from it not being necessary to prepare umbrella part material etc. to the inner member 12 Umbrella part material interferes in the outer member 14 or rubber elasticity object 16 grade at the time of an oscillating input, and it is damaged, or The endurance and reliability in which were stabilized, were demonstrated, and obtained and the vibrationproofing effect based on a resonance operation of the fluid which umbrella part material does not separate and flows through the constriction passage 58 was effectively excellent may be secured.

[0040] And it sets to the engine mount 10 like \*\*\*\*. Since it is not necessary to prepare the umbrella part material which spreads in the method of the outside of the direction of a path from the inner member 12, the inside dimension method of the main liquid room 54 is added to it not being necessary to enlarge specially. From the formation portion of the constriction passage 58 in the main liquid room 54 being minor-diameter-ized by the inner direction projected part 57 The fluid flow rate made to flow the inside of the constriction passage 58 at the time of the oscillating input of the direction of an axial right angle (the direction of a path) by the hoop direction is stopped a little, and high dynamic spring-ization resulting from a fluid operation of this fluid may be mitigated or prevented.

[0041] The result of having measured the damping characteristic [ as opposed to input vibration of the direction of an axial right angle for the result of incidentally having measured the damping

characteristic over input vibration of shaft orientations about the engine mount 10 made into the structure like \*\*\*\* ] to drawing 7 again is shown in drawing 8 , respectively. In addition, in these drawing 7 and drawing 8 , without reducing the diameter of the pars-basilaris-ossis-occipitalis side of the main liquid room, the result of having performed the measurement same about the engine mount of structure as usual which prepared the umbrella part material which spreads in the method of the outside of the direction of a path from an inner member, and formed annular constriction passage is combined as an example of a comparison, and is shown, respectively.

[0042] To input vibration of the direction of an axial right angle, it is clearly admitted from the result which it was admitted that the effective low dynamic spring effect might be demonstrated like the example of a comparison in the about 100–200Hz high–frequency region where high–speed \*\* is also equivalent to \*\*\*\* etc. to input vibration of shaft orientations from the result shown in drawing 7 , and was shown in drawing 8 that remarkable high dynamic spring–ization which is seen at the example of a comparison is suppressed. In addition, in drawing 7 , in the engine mount 10 of this example, although increase of a dynamic spring constant is seen in 200–300Hz as compared with the thing of the example of a comparison, it is because low dynamic spring–ization in a 100–200Hz frequency region was mainly aimed at and the constriction passage 58 was tuned up, and this can also realize the example of a comparison, and the damping characteristic of abbreviation identitas by tuning at the engine mount 10 of this example.

[0043] And in the engine mount 10 of this example, since the inner direction projected part 57 is constituted by the orifice metallic ornaments 38 for forming the orifice path 74, the formation space of the orifice path 74 may be secured advantageously, and deployment of a space and reduction of components mark may be achieved.

[0044] Next, the engine mount 90 as another example of this invention is shown in drawing 9 .

[0045] In the engine mount 90 of this example While the inner member 91 is formed to the shaft–orientations point of the attachment shaft metallic ornaments 92 of a hollow cylinder configuration by fixing the inner rod 94 made of resin with a larger outer diameter than it Predetermined distance is separated to the method of the outside of the direction of a path of this inner member 91, and the cylindrical shape–like orifice metallic ornaments 104 are arranged. Between these inner member 91 and the orifice metallic ornaments 104 The rubber elasticity object 106 which has the shape of a heavy–gage abbreviation taper cartridge as well as said first example is infixed, among those vulcanization adhesion is carried out in the peripheral face at the inner member 91 and the orifice metallic ornaments 104.

[0046] Moreover, on the other hand, the outer member is constituted by outer metallic–ornaments 96 simple substance which has the shape of a closed–end cylindrical shape which carries out a opening caudad. While the level difference section 98 is formed in the shaft–orientations interstitial segment and the pars–basilaris–ossis–occipitalis side is used as the narrow diameter portion 100 rather than this level difference section 98, let the opening side be the major–diameter section 102 rather than the level difference section 98 at these outer metallic ornaments 96. In addition, the inside diameter of a narrow diameter portion 100 is made smaller than the outer–diameter size of said rubber elasticity object 106.

[0047] And the inner member 91 is inserted in the interior of these outer metallic ornaments 96, and while the point of this inner member 91 reaches even in the narrow diameter portion 100 of the outer metallic ornaments 96 and being made it to be located, the inner member 91 and the outer metallic ornaments 96 of each other are elastically connected with the major–diameter section 102 of these outer metallic ornaments 96 through the rubber elasticity object 106 by carrying out press fit immobilization of the orifice metallic ornaments 104.

[0048] moreover, the thing which the diaphragm 112 of the abbreviation circular ring board configuration where the metallic tube implement 108,110 consists of light–gage rubber membrane by which vulcanization adhesion was carried out, respectively is allotted to the method of outside [ object / 106 / rubber elasticity ] (lower part) by the inside–and–outside periphery section, and is done for the press fit immobilization of each metallic tube implement 108,110 at the inner rod 94 and the outer metallic ornaments 96 — this diaphragm 112 — opening between these inner rod 94 and the outer metallic ornaments 96 — a fluid — it is covered densely.

[0049] Of it, the main liquid room 114 where predetermined incompressible fluid was enclosed, respectively, and the subliquid room 116 are located for them and formed in the both sides which sandwiched the rubber elasticity object 106 in the interior of the outer metallic ornaments 96. And while internal pressure fluctuation is made to produce the main liquid room 114 based on the elastic deformation of the rubber elasticity object 106 at the time of an oscillating input, as for the subliquid room 116, capacity change is easily permitted by diaphragm 112.

[0050] Moreover, these main liquid room 114 and the subliquid room 116 are mutually opened for free passage through the orifice path 118 formed by covering the circumferential groove 117 formed in the peripheral face of the orifice metallic ornaments 104 by the outer metallic ornaments 96, and the fluid flow which leads the orifice path 118 between the main liquid room 114 and the subliquid room 116 is permitted. And in this example, the high damping effect over subsonic vibration, such as a shake, is demonstrated like said example based on a fluid operation of the fluid made to flow through this orifice path 118.

[0051] The engine mount 90 made into such structure For example, like said example, the bracket 122 of the shape of a cylindrical shape equipped with the attachment leg 120 is received as shown in drawing 10 . While press fit immobilization is carried out, the outer metallic ornaments 96 are attached and the outer metallic ornaments 96 fix to a body 124 side through this bracket 122, with the bolt 126 screwed on the attachment shaft metallic ornaments 92 of the inner member 91 When the inner member 91 fixes to a power-unit 128 side, a power unit 128 will be hung to a body 124 side, and the elastic suspension will be carried out in the condition. In addition, drawing 10 shows the condition that the support load of a power unit 128 was inputted to the engine mount 90.

[0052] Namely, it sets to the engine mount 90 of this example. While projecting to the method of the inside of the direction of a path and forming the constriction passage 130 between the direction opposed faces of a path with the inner member 91 by the narrow diameter portion 100 of the outer metallic ornaments 96, the way projected part 132 is constituted. So, at the time of an oscillating input, while being demonstrated effectively, the low dynamic spring effect as opposed to [ based on a fluid operation of the fluid made to flow through this constriction passage 130 ] high frequency oscillation, such as \*\*\*\*, also in high-speed \*\* The fluid style mechanical moment of the hoop direction in the constriction passage 130 is stopped by the inner direction projected part 132, the remarkable rise of a dynamic spring constant at the time of the oscillating input of the direction of a path may be avoided, and the same effect as said first example may be effectively done so by it.

[0053] And in this engine mount 90, since the way projected part 132 is formed with outer metallic-ornaments 96 simple substance while forming the constriction passage 130, as compared with said first example, there are few components mark, and they end and simplification of structure and improvement in manufacture nature are attained much more advantageous.

[0054] As mentioned above, although the example of this invention has been explained in full detail, these are literal instantiation, and this invention is limited only to this example and interpreted.

[0055] For example, although each applied this invention to mounting of the type which hangs and supports a power unit and the example was shown in said example, this invention can be applied also like mounting of the type which carries out \*\*\*\* support of the power unit, and shows the one example to drawing 11 . In addition, this drawing 11 shows the wearing condition that power-unit weight was done, like drawing 10 , and detailed explanation is omitted by \*\*\*\*\* which attaches the same sign as said second example to a part in the member made into the same structure as said second example among drawing, respectively.

[0056] Moreover, in said first example, although moving-part material was constituted by the movable rubber board 42 in which elastic deformation is possible, it is also possible to constitute moving-part material by the hard or flexible movable plate which is replaced with it for example, by which only minute distance was supported possible [ displacement ] at the main liquid room 54 and subliquid room 72 side.

[0057] furthermore -- although this invention was applied to the engine mount for automobiles

and the example was shown in said example — this invention — in addition, body mounting for automobiles — or of course, it may be advantageously applied also to various kinds of mounting equipments used in addition to an automobile

[0058] In addition, although listing is not carried out one by one, unless this invention may be carried out in the mode which added modification which becomes various, correction, amelioration, etc. based on this contractor's knowledge and such an embodiment deviates from the meaning of this invention, it cannot be overemphasized that it is that by which all are contained within the limits of this invention.

---

[Translation done.]

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DESCRIPTION OF DRAWINGS**

---

**[Brief Description of the Drawings]**

[Drawing 1] It is longitudinal-section explanatory drawing showing the engine mount as one example of this invention.

[Drawing 2] It is the drawing of longitudinal section really constitutes the engine mount shown in drawing 1 showing vulcanization mold goods.

[Drawing 3] It is the plan showing the outer bottom wall member which constitutes the engine mount shown in drawing 1 .

[Drawing 4] It is an IV-IV cross section in drawing 3 .

[Drawing 5] It is a V-V cross section in drawing 3 .

[Drawing 6] It is the drawing of longitudinal section showing the covering device material which constitutes the engine mount shown in drawing 1 .

[Drawing 7] It is the graph which shows the result of having measured the damping characteristic over shaft-orientations input vibration of an engine mount shown in drawing 1 .

[Drawing 8] It is the graph which shows the result of having measured the damping characteristic over the direction input vibration of an axial right angle of an engine mount shown in drawing 1 .

[Drawing 9] It is longitudinal-section explanatory drawing showing the engine mount as another example of this invention.

[Drawing 10] It is longitudinal-section explanatory drawing showing the wearing condition of an engine mount shown in drawing 9 .

[Drawing 11] It is longitudinal-section explanatory drawing corresponding to drawing 10 showing the engine mount as still more nearly another example of this invention.

**[Description of Notations]**

10 90 Engine mount

12 91 Inner member

14 Outer Member

16,106 Rubber elasticity object

26 Outer Metallic Tube Implement

28 Outer Bottom Wall Member

38 Orifice Metallic Ornaments

42 Movable Rubber Board

54,114 The main liquid room

56 Level Difference Side

57,132 Method projected part of inside

58,130 Constriction passage

72,116 Subliquid room

74,118 Orifice path

96 Outer Metallic Ornaments

98 Level Difference Section

---

[Translation done.]